

Perception of safety and passage of time as factors influencing mode choice: The case of the Prague-Munich high-speed route

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Abstract

Behavioural factors of risk perception and time perception influencing the mode choice on the Prague-Munich route in relation to railway as a reference mode, are subject to evaluation in this article. Semi-structured interviews are qualitatively analysed using the Grounded Theory method and ATLAS.ti software, giving specific sets of meanings and understandings of selected factors, which in turn affect the travel behaviours and the mode choice. Defining these factors creates space for estimating and proposing perspectives for the development of expected travel behaviours in the context of the planned high-speed rail (HSR) system on the Prague-Munich route. The significance of this research lies in creating new meaning fields of selected factors in the specific transport infrastructure with four existing transport modes between Prague and Munich. The results based on the formulated concepts show two different meaning fields of risk – the concept of perceived risk of an accident and the concept of personal safety. Empirical results of time perception show four different meaning fields of time perception based on a preferred transport mode. Finally, the results are used for creating contextual perspectives for HSR planning across Czech – German borders.

Key words: *high-speed rail, risk perception, passenger-perceived time cognition, mode choice, grounded theory, theory of planned behaviours, Czech Republic, Germany*

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1. Introduction

For many years, researchers have been trying to decipher complicated patterns of transport behaviours, with particular emphasis on understanding the reasons for preferring certain modes of transport over others. Socio-psychological factors, such as perceptions of identity, habits and norms, are increasingly being explored in order to better understand mode of transport choice (e.g. Bamberg and Schmidt, 2001; Forward, 1998; Galdames et al., 2011; Kaewklungklom, et al., 2017; Steg et al., 2001; Tertoolen et al., 1998; Verplanken et al., 1994). Many other studies (Anable, 2005; Bamberg et al., 2003; Rothengatter and Vaya, 1997) use psychological theories of attitudes to predict transport mode choice. Theories generally agree in the conclusion that the mode choice is to some extent influenced by decisions, personal attitudes, habits or, for example, various external and internal obstacles (Bamberg and Schmidt, 1998; Forward, 1998; Hunecke et al., 2007).

While increasingly sophisticated research and analysis of transport behaviours enables researchers to better

understand the process of choosing a mode of transport, sets of ideas and a deeper understanding of unperceived and hidden socio-psychological behavioural factors are seldom analysed. Especially in geographical research that is traffic related, qualitative approaches are still infrequent – yet such approaches can shed more light on the above-mentioned psychological factors. This study is based on the analysis of two hitherto little studied factors of transport mode choice, namely the perception of safety and the passage of time during the journey. We use a Grounded Theory method (hereinafter GTM; Glaser et al., 1968; Strauss and Corbin, 1994), where the analytical process consists of data coding, development, control, and integration of new theoretical categories (Řiháček and Hytych, 2013).

This study is based on interviews with passengers on the Prague–Munich route (see Fig. 1), to define the content of selected safety factors and the passage of time, and to estimate perspectives in the preference for transport modes in relation to future High-speed rail (hereinafter HSR) development, with emphasis on these factors. The results of

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semi-structured interviews with a total of 30 informants – passengers by bus, car and plane in comparison with a train journey in the autumn of 2019 – are evaluated.

A discussion of the existing literature studying the factor of perceived safety and the factor of the passage of time is first presented in detail. Subsequently, methodological approaches are discussed, in which the form and construction of questionnaires, data collection and the method of their evaluation using the Atlas. TI software for the analysis of qualitative data are described. The methodological part is followed by the empirical part with the presentation of the results for the mentioned factors. The role of gender in connection with the concept of both factors is also evaluated in more detail here. In the end, recommendations, and implications for the perspective construction of HSR on the Prague–Munich route are proposed.

2. Theoretical background: Conceptualisation of travel safety and passage of time

2.1 Perception of safety

One of the key socio-psychological factors in the mode of transport choice is fear, or rather perceived safety, which can significantly influence human behaviours in the form of ideas about the safety of individual transport modes. Maslow (1970) ranked the feeling of safety and security as a biological need second only to the basic physical and physiological needs of humans. Thus, in his view, the feeling of safety is the imaginary second cornerstone of human needs. Perceived safety as a part of perceived behavioural self-control plays an important role in the patterns of resulting behaviours, found also in the fundamental theory of planned behaviours of Ajzen and Fishbein (1980). There have been several studies on perception of safety in the literature outside of East Central Europe, but no research on this specific socio-psychological factor of mode choice in the context of HSR has been done in any academic environment of the Czech Republic and neighbouring regions.

In this paper we present a hypothesis that the cognition of transport safety can be conceptualised into two areas:

- i. Fear for one's own health or life due to the risk of a traffic accident; and
- ii. Fear of assault and harassment, which is associated with theft, inappropriate behaviours, transgression in an unknown environment, etc.

2.1.1 Safety as a perceived risk of a traffic accident

The connection between the human perception of fear and the possibility of a traffic accident is a relatively frequently examined relation in the literature. The human perception of safety is often differentiated according to the type of transport mode (e.g. Backer-Grøndahl et al., 2009; Roche-Cerasi et al., 2013; Rundmo et al., 2011). Specific differences in the perception of safety across different transport modes have been demonstrated in relation to travel behaviours (Backer-Grøndahl et al., 2009). The transport behaviours of people are not fully rational, however, because statistically the most dangerous transport mode – the car – is the most used means.

Previous research on the general perception of transport risks has found that transport risk falls into two main categories: public and private transport mode (Moen and Rundmo, 2006). Backer-Grøndahl et al. (2009) take this division into two categories and enrich it by finding that the probable interpretation of the difference between these factors is related to whether one must communicate with other people in a given transport mode. In private transport, as opposed to public transport, there is no need to interact with other people, which in turn can mean a potential risk for passengers using public transport. Within public transport, the threat of unpleasant events, violence, robbery, etc., are more relevant than the threat of an accident. In the case of air transport, on the other hand, many people are afraid to fly, despite favourable accident statistics.

In private transport, which most often consists of individual car transport, psychological studies have found that car drivers generally rate themselves as more qualified

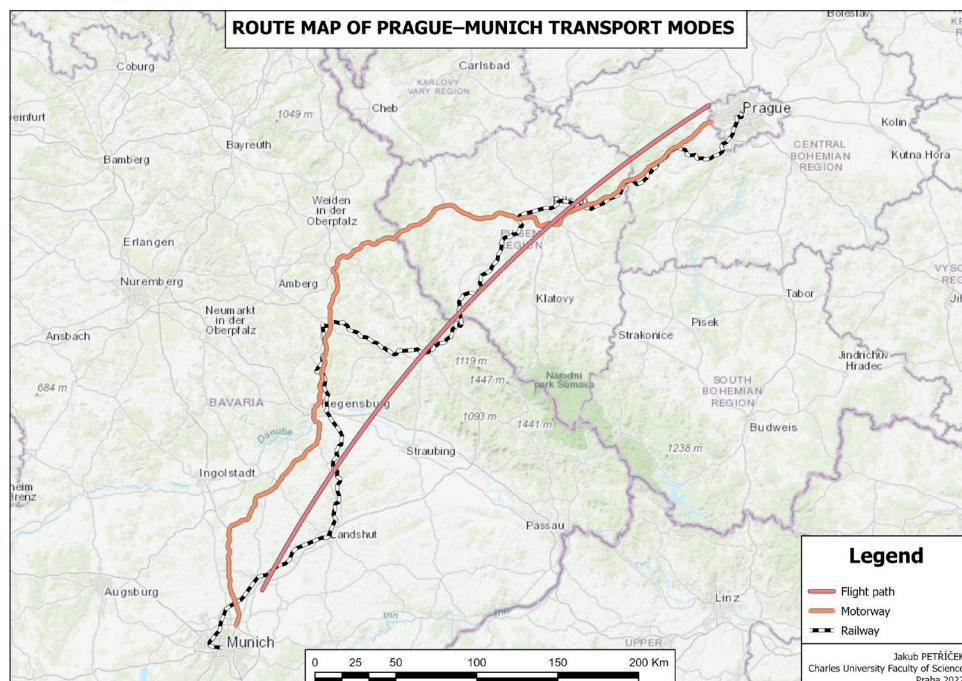


Fig. 1: Route map of Prague–Munich transport modes
Source: authors' elaboration

than the average driver (Delhomme, 1991; Goszczynska and Roslan, 1989; McCormick et al., 1986; Svenson, 1981;). This means that drivers perceive it as safer when driving themselves, compared to driving with another driver or using public transport. The idea of self-control over the vehicle is therefore important in this concept. The feeling of self-control does not appear psychologically when using public transport, and trust in public transport drivers may be less compared to self-control in driving a private car.

The perception of safety related to the risk of travelling by transport mode is therefore directly linked to the mode of transport used and its nature in terms of public vs. private transport. Perceived control over private modes of transport, knowledge of safety and trust in institutions differs significantly for passengers who frequently use individual car transport compared to those who prefer public transport. Nordfjærn and Rundmo (2011) conclude that greater concerns about accidents are expressed by passengers in private transport. Rundmo et al. (2011) further elaborate that the perception of safety in individual and public transport is also something that most passengers have personally come to terms with and do not consider them to be a key factor in their transport decisions. Passengers are generally able to think reasonably and calmly about the mode of transport choice, as they are aware of the risks and perceive their decision without fear of the risks arising from the use of specific modes of transport.

Backer-Grøndahl et al. (2009) conclude that fears of accidents affect changes in the transport behaviours of private vehicles, while concerns about unpleasant events cause changes in behaviours in public transport. The results of a study by Nordfjærn and Rundmo (2011) highlighted a significant increase in vehicle safety priorities related to transport safety. From these examples, the mode of transport choice is a complex process where the objective danger is reduced or modified by factors of a subjective nature.

An exception to thinking about the risk of an accident is air transport. If an air accident occurs, the consequences are usually serious. People try to suppress thinking about a traffic accident as part of their transport behaviours, however, even though these consequences can be serious (Rundmo et al., 2011). Passenger self-control is more influenced by the generally accepted truth about the very low probability of an air accident in the context of accidents of other modes of transport. Major air disasters or global pandemics (e.g. the events of September 11, 2001, or the COVID-19 pandemic) lower the motivation to use air travel. These events can evoke an increased fear of air travel in humans (Gigerenzer, 2004; Lamb et al., 2020).

On the contrary, passengers think about rail transport differently. The study by Nordfjærn et al. (2014) shows that rail transport is most chosen by passengers who fear an accident, while it is not sought after by passengers who fear theft or harassment, for example.

2.1.2 Personal safety

Perceived self-control as a factor in the mode of transport choice is not only affected by the perception of the risk of an accident. The second component of perceived safety in transport is the feeling of personal safety. Safety is generally considered by Gilovich et al. (2001) to be a subjective feeling that pertains to our rapid, instinctive, and intuitive responses to danger. Loewenstein et al. (2001) talk about risk as a feeling, hypothesising that those responses to

danger and risk situations are due in part to direct emotions such as fear and anxiety. Similarly, Zajonc (1980) mentions a sense of security in relation to emotions, arguing that emotions may be primarily cognitive and may also precede cognitive action.

In the case of concerns about harassment or assault, there is probably a fundamental difference in the means of individual transport versus public transport. A private transport mode provides its own environment, controlled by the owner, who decides who will be allowed into the transport mode, etc. Although public transport modes place greater emphasis on respecting societal norms that should ensure safety, however, in subjective human perception, public transport, with its risks to personal safety, can at the same time limit the user's comfort and evoke feelings of discomfort, anxiety, etc. Compared to individual transport, the risk of terrorism, harassment and violence is generally perceived more in public transport. Due to these concerns, passengers who perceive a high risk of such events may tend to avoid public transport, even if it is in some cases the most timewise and economically advantageous option for a given route (Nordfjærn et al., 2014).

Various concerns about personal safety are also noted from the perspective of gender research. Several studies such as Delbosc and Currie (2012), Hsu et al. (2019), Levy (2013), Yavuz and Welch (2010) examined the gender factor influencing the perception of risk in transport (such as crime, harassment). The gender factor plays a role in the perception of the environment in a transport mode, which is risky, especially for women, and less so for men. Gender-based concerns about personal safety may subsequently discourage the use of a certain transport mode, especially public ones with shared public space. The feeling of safety in connection with gender, however, tends to have generally a smaller effect on passengers' willingness to use public transport and its frequency.

The Health Belief Model (Rosenstock, 1974) and The Protection Motivation Theory (Rogers, 1975) shed light on the background of the safety factor for individual behaviours. Theories agree that an individual's perception of safety is important in his or her behavioural intentions. This is especially in cases where decisions involve a high degree of uncertainty. Based on these theories, it can be assumed that passengers who are concerned about their personal safety when travelling by public transport will prefer to drive more often to reduce this risk due to their protection. Conversely, people who perceive safety from the point of view of a car accident will tend to gravitate toward using public transport. In the area of perceived transport behaviours, it is therefore crucial to divide and identify both levels of perceived safety.

2.2 Perceived passage of time

The second factor examined, the passage of time, is mentioned by many as important for understanding the relationship to society's travel behaviours (e.g. Algers et al., 1996; Wittmer and Laesser, 2010). The perceived journey time on the road directly affects passenger satisfaction and is therefore a crucial factor for passenger travel behaviours (Meng et al., 2018). In this paper, examining perceived passage of time on a specific route, where possible types of delays are well documented by passengers in four travel modes, brings a considerably novel methodology in the context of the perceived passage of time, especially in the post-socialist Central East European region.

Previous studies have examined the perception of time spent by passengers waiting (Fan et al., 2016; Hess et al., 2004; Lagune-Reutler et al., 2016; Millonig et al., 2012; Watkins et al., 2011). Studies generally agree that passengers generally perceive real-time waiting for public transport as longer, especially when no real-time traffic information is provided (e.g. departure information boards).

The common factors of this perceived “extension” of time are most often a lack of comfort, travelling in rush hour traffic, an emotionally longer time when transferring or walking to a stop in the case of public transport. The general definition of the value of travel time is always based on the highest benefit, which depends on the choice of a specific alternative (in our case, the mode of transport), considering key variables such as income, price, and other characteristics. In general, there is ambiguity among authors in the research literature in specific definitions and specifications of travel time, depending on the examined mode of transport, type of trip, etc. Hensher (2001) defines travel time as the willingness of a passenger to financially compensate for a certain amount of time saved. Becker (1965) operates with the concept of direct benefit from travel time, where the passenger clearly prefers the way of spending time in the transport mode over the total absolute value of travel time. Wardman (2001) highlights the role of possible complications in total travel time, such as rail delays, traffic congestion, accidents, cancellations, vehicle failures, and others. Givonni and Banister (2012) speak of travel speed itself as a less important element in the context of HSR than the total perceived travel time.

Existing literature (Cheng and Tsai, 2014; Meng et al., 2018; Wittmer and Laesser, 2010) explains the longer perception of time in consciously perceived slow situations (e.g. traffic congestion, train delays) and unpleasant situations (e.g. bad weather, overcrowding). On the contrary, pleasant, and fast situations increase the speed of subjective time due to the concentration on a given pleasant event (e.g. refreshments on the train, conversation with friends, etc.).

Usually, research on estimates of perceived time focuses on only one mode of transport, most often only on public transport. In public transport in particular, journey times are one of the basic elements that strongly influence passengers’ views on the quality of transport services (Krygsman et al., 2004). For example, during the time spent waiting at a station, passengers generally expect to board the bus as soon as possible. Another reason for the longer perception of time is registered for passengers who are exposed to a lack of comfort, overcrowding and bad weather. This time is perceived by passengers longer than they spend in the context of the whole journey (Beirão and Cabral, 2007).

Hall(2001) and Meng et al. (2018) elaborate on the perception of time by claiming that waiting times are perceived differently by passengers based on age. Post-productive age passengers generally perceive waiting time as shorter than productive age passengers.

Research often discusses only the transfer phase and the waiting time, not the entire riding time. The current research contributes to the literature by examining the relationship between actual and perceived value of travel time across all existing modes (aircraft, bus, train, car) on a particular route, considering the specifics of these modes of transport in relation to existing transport infrastructure on the route, the possibilities of activities on the way, the purposes of passenger journeys, frequency and the quality of services.

In the Czech environment, Máca and Braun Kohlová (2019) studied the topic of the passage of time. Their study concludes that the value of time spent in a traffic jam is almost twice the value of the time spent travelling in freely flowing traffic. Máca and Braun Kohlová (2019) highlight the economic benefit of reducing traffic congestion compared to reducing travel time in normal smooth traffic without delay. This evidence confirms the crucial importance of distinguishing between different travel modes in assessing the benefits of transport infrastructure.

3. Methodology

For the empirical part of the study, a traffic-sociological survey was conducted, which was carried out among airline users, bus passengers and passengers by car on the Prague–Munich route. The survey, which was part of the research on the OP RDE New Mobility, was carried out with a qualitative research strategy. The aim of the transport-sociological survey was to map independent information about the opinions, preferences, and habits of informants. The results of semi-structured in-depth interviews with a total of 30 informants were evaluated – 12 passengers on the Prague–Munich route by bus, 7 by car and 11 by plane. After the main research, eight travellers by train on the route Prague–Domažlice were interviewed in the Spring of 2020. Due to COVID-19 restrictions causing cancellation of international trains to Germany, these answers were not evaluated in this analysis because of incoherence among the interviews and the non-international route of those travellers. Descriptive data of all participants are presented in Table 1 below.

In the interview, the informants expressed their views on the transport mode used in comparison with the train journey. If they had not used the train, they were informed about the alternative use of the train connection (speed, frequency, price). The conversations took place in the autumn of 2019. The participants were recruited with respect to the diversity of their education, gender, different productive age groups, and income groups.

The construction of the questionnaire resulted from the main goal of the survey – to define selected safety factors and the passage of time that affect the mode of transport choice on the Prague–Munich route in relation to the railway as a reference mode. Qualitative data collection techniques

Focus groups by preferred transport mode	Number of respondents by gender		Average age	Average income [net, thousands of CZK]
	Male	Female		
Car	5	2	38	30–39
Bus	6	6	40	20–29
Aircraft	6	5	37	40–49

Tab. 1: Descriptive data of participants in the preferred transport mode groups on the Prague–Munich route
Source: authors’ survey

were used to achieve this goal. Three group discussions based on preferred transport mode (car, plane, bus) were held – focus groups and several dozen collections of in-depth semi-structured interviews in specific environments of train stations, bus stations and airports. These methods are characterised by a defined purpose, a certain syllabus and great flexibility of the whole process of obtaining information. These are very effective qualitative methods that allow a deep insight into the researched issues with the knowledge of the target group (Hendl, 2005).

The structure of the interview was based on the theoretical concept of the Theory of Planned Behaviours (Ajzen, 1991; Heath and Gifford, 2002). Sets of safety factor questions have been divided into sections to find out the reasons for their choice, with an emphasis on the reasons for their sense of security or danger, to find out how passengers feel about their sense of safety and whether their views differ from their travel behaviours. The individual transport modes on the route were also compared. The sets of questions about the passage of time focused on the feeling of slow or fast passage, travel activities and consciously unpleasant situations. The questions also emphasised determination of the preferences of the selected transport mode in relation to the passage of time. The aim was to identify the different thinking of passengers in the context of their choice of transport connection and the purpose of the trip.

The questions and answers were deepened during the discussion to find out the most precise reasons, preferences, and habits of the passengers on the route. The interviewers emphasised listening to the narratives of the communication partners and the informal conception of the conversations. The interviews were recorded and subsequently transcribed into text documents. The individual questions were structured and transcribed in such a way as to distinguish the intentions and the resulting actions of the passengers in the mode of transport choice.

The results were evaluated by the Grounded Theory Method (GTM) (Glaser et al., 1968; Strauss and Corbin, 1994) and analysed by a software tool for evaluating qualitative data: ATLAS.ti. The basis of GTM is an organised and interactive approach to data collection and analysis using the so-called “constant comparison method”. The analytical process contains four basic steps: data coding, development, control, and integration of theoretical categories (Řiháček and Hytych, 2013). At the beginning of the process, the data were coded and compared

to analyse potential preliminary categories, which were then collected into more general ones. With the help of open code assignment and conceptualisation of data (for example, accidents, accident frequency with statements about the feeling of safety), a gradual essence of analysed factors was created with assigned concepts (e.g. risk of car accident, slow flow waiting in a queue at the airport). In this phase, emphasis was placed on the search for relationships between selected concepts that have hitherto been abstract in nature (e.g. the presence of flight crew vs. personal safety in the aircraft). Based on these relationships, which explained the idea, principle, and experience valid across various statements or situations, content structures were subsequently created that fulfilled the concepts of security and the passage of time.

In the second phase of the evaluation, the declared relationships between the created concepts were sought and the hierarchy and final explanation of the concepts were determined. Subsequently, parts of the informants' statements were assigned to the concepts created on the principle of theoretical axial coding (Glaser, 1978; Strauss and Corbin, 1999). Several variants of the investigated phenomena were found in the statements of informants. In the last part of the GTM process, the created concepts were synthesised within the factor of perceived safety and the passage of time, thus creating the final concept, which is presented in the following section.

4. Results and discussion

4.1 Perception of safety

The basic research goal was to try to uncover and understand the perception of safety in relation to travel behaviours. The aim is to create a final concept, which is preceded by the search for relationships and connections using inductive methods according to GTM for qualitative data evaluation. When using the GTM-based methods, we tried to avoid just listing the concepts in our research. Attention was paid to the interpretation of a meaningful background and the story of the two formulated concepts. The result is a graphical representation of the thematic structure of statements about perceived safety in transport modes on the Prague–Munich route. The structural analysis of the statements revealed generally two basic units, which stand side by side in the perception of safety as different concepts of safety (see Fig. 2).

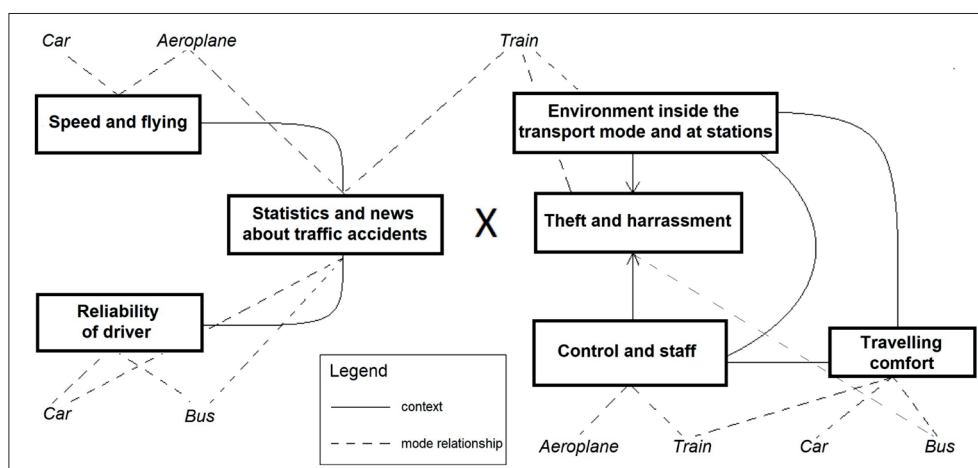


Fig. 2: Thematic structure of safety statements on the Prague–Munich route
Source: authors' data collection and representation

4.1.1 Accident frequency as an idea of safety

The left part of the thematic structure (Fig. 2) shows passengers' perceptions of safety from the point of view of accident frequency. This level is formed through ideas of safety in the statistical concept of the number of accidents on individual transport modes, which are directly related to factors such as vehicle speed in the case of cars, fear of altitude or flying at altitude in the case of air transport, and for bus and car connections, professionalism, and confidence in the driver. Passengers perceive the ideal safe transport mode in terms of the number of accidents or the chances of an accident differently, based on their experience, information from the media, their own observations, or assumptions about the statistical number of accidents, as evidenced by the following set of statements:

I feel safest on the bus. It's because of statistics that I follow a lot. I know that a car is much more dangerous than a bus... I know that flying is statistically safest, but I am extremely afraid of flying, so I try to fly as little as possible. I don't feel good about it, I usually feel ill... When I can, we always go by car, bus or train... There is nothing I can do about far-away journeys. For example, I had to fly to Malta, of course.

There are definitely fewer accidents on trains. I perceive the train as being safer than a plane or bus. Especially now after having just seen the news about the bus in Nitra.

My husband doesn't drive badly, but he's so distracted in the car, so I have a greater sense of safety and comfort on the train.

I see buses as the most dangerous in terms of accidents. I don't feel comfortable or safe there. It's too big, you don't even know who's driving the bus (if he's tired, if he's a good driver). At least they have an autopilot on the plane if the pilot falls asleep.

... or when I see some suspicious behaviours on the part of the driver, that they are bored, not paying attention to driving or not paying attention to the traffic. It has happened to me several times. From this point of view, I think that the road is not completely safe.

From the statements of these informants, fears about the quality of drivers and their behaviours behind the wheel, which shape the informant's ideas about the safety of traffic modes, are clear. Based on their perceptions and personal experiences, they attach preferences to individual transport modes in terms of safety. In the case of air transport, the perceived safety is determined by the height at which the aircraft moves or the general fear of flying. Some informants explain their fears of flying precisely because of the fear of height, and this fear is in most cases not explained by any rational argument, but informants perceive it so emotionally.

I don't know why, but I'm most afraid of the plane. Surprisingly. It is somehow connected to the fact that a person is in the air. When I'm firmly on the ground, whether by bus or train, I feel much safer. Maybe it's nonsense – it's a feeling.

It's supposed to be safest by air. Of course, everyone has a slight feeling of fear before boarding a plane, they don't think about this before boarding a train or bus.

A common element of all the above-mentioned statements is the perception of safety from the point of view of a traffic accident, although it may be caused by various conditional factors, which may contribute to the resulting traffic

accident to different degrees. These scales do not allow conceptualisation to be more accurate, but their nature is obvious. A higher safety risk is associated with the perceived quality of the driver and confidence in their abilities.

4.1.2 Personal safety as a factor of mode of transport choice

The second half of the thematic structure (Fig. 2) explains the perception of safety at the level of personal safety, which is inextricably linked to travel, especially by public transport (Backer-Grøndahl et al., 2009; Rundmo et al., 2009; Rundmo et al., 2011). The level of personal safety is formed through the ideas and experiences of respondents with theft, harassment, generally different social environments, or personal control, which together more or less make the journey more pleasant for passengers in different modes of transport. As a result, these ideas and experiences generally formulate an opinion on the comfort of travel by the transport mode themselves, which is summarised in the following statements.

By bus – one believes or I don't know how to explain it – the presence of on-board staff also plays a role, it depends on the people around. But I still like to take the bus.

[On the plane] it is also reassuring that no one can have weapons, liquids or anything dangerous there. You never know on a train or bus...

The feeling of safety [on the plane] is probably derived from the fact that I'm just sitting and being taken care of by flight attendants.

There is more control on the plane, they check people several times at the airport, flight attendants are always walking around the plane and checking what you are doing.

Within the framework of personal safety in transport, informants show sensitivity to harassment, the social environment (drunks, rioters, vandals), but also the physical environment (passenger car, station environment, nearby park, etc.).

There are a large number of passengers on the train. The train stops at more places where passengers get on and off, and they can steal your luggage, so I can never sleep on the train.

Theoretically, I'm afraid of rioters and drunks, but that usually doesn't happen on long-distance routes when it's going straight and doesn't stop anywhere. I'm not really afraid. But theoretically, there is a higher risk that someone drunk will come in to harass me.

Then, of course, the danger can come from fellow passengers. It has happened several times that, for example, when someone was drunk, the bus stopped, and the police, for example, had to pull the drunk off the bus and arrest them.

A common feature of personal safety statements is generally the passengers' perceptions of the control of the space of the transport mode. The psychological factor of security checks and the presence of cabin crew has been shown many times in similar research to be an important factor in the mode of transport choice (Backer-Grøndahl et al., 2009). Potentially unpleasant situations and environments when travelling by train or bus are considered by many authors to be a more important safety factor than the risk of an accident (Rundmo and Moen, 2006; Rundmo et al., 2011).

The results of our research also show differences in the perception of safety based on gender. In terms of a qualitative comparison, in our sample of informants,

mostly women talk about personal safety when being asked about the train as a reference mode. In general, women often cite assault and theft, especially at night, as reasons for personal safety concerns. Men, on the other hand, emphasise the experience of car accidents in their answers, or emphasise the presence of aircrew on business trips by plane, which is in line with the professional literature on gender in transport (Dobbs, 2005; Fyhri and Backer-Grøndahl, 2012; Gordon et al., 1989).

An analysis of the narratives of our informants shows that the safety factor has two structural levels (Fig. 2):

1. The level of accident frequency, in which it is primarily a perception of safety in terms of a possible traffic incident. This is conditioned by accident statistics, driver quality and the physical environment of the vehicle's movement (e.g. flying in the air); and
2. Level of personal safety, which is conditioned by factors of comfort, control, physical environment (e.g. coupe, platform), but also the social environment of individual means.

4.2 Perceived passage of time

The aim of the research of this factor was to understand the perception of the passage of time in connection with travel behaviours for selected modes of transport on the Prague–Munich route, based on the search for relationships and connections using inductive methods according to GTM for qualitative data evaluation. In contrast to the previous section on safety, the passage of time is assessed and compared between the transport mode examined for clarity. The purpose of the analysis of the passage of time was to understand the meanings and relationships between individual structures. First, a rough structure was created by dividing the codes based on the relationships of faster and slower passage of time of the selected transport mode in comparison with other investigated means.

From this very extensive rough structure of the comparison, after indirect recoding, four indirectly observed and implicitly expressed meaning fields were subsequently derived and constructed:

- On regular trips to work, time passes the fastest by bus;
- Time passes the fastest on a comfortable train;
- Time passes the fastest by plane because it moves the fastest; and
- Time flows the fastest in one's own means due to independent movement and the possibility of individual mobility.

The first meaning field is a characteristic of statements about regular business trips. For some informants, a certain connection can be observed in the faster passage of time if they are not travelling on the route for the first time, as described by Givonni and Banister (2012). This frequency of connections is then the basis for a rapid perception of travel time, in which the optimal balance of the distribution between distance perceptions and total time perceptions plays a key role, as discussed by Wittmer and Laesser (2010). The journey by bus in this meaning field is perceived based on the statements of informants as the fastest in comparison with all other modes of transport, precisely due to the speed of time in the bus. The meaning field of the "fast" bus, characterised by the ability to spend time with the passenger's favourite activities (sleeping, reading, watching movies) and the emphasis on the slow flow of time

traveling by plane (respondents compared this when asked by the interviewer), waiting at airports, airport checks and in general throughout the airport check-in process:

I sleep, read, look out the window, talk to my friends. It passes by faster.

Subjectively, my journey passed faster by bus because we slept.

The connection between the passage of time in the bus and the purpose of the journey and the regular long-distance mobility is also evidenced by the passenger whose purpose of the journey is business. She rides on the route regularly and does not consider the time spent on the bus to be long. Time passes by quickly, because she is already used to travelling on the Prague–Munich route for work. Habituation, together with regularity, is one of the reasons for the final choice of bus, as confirmed, for example, by the study by Verplanken et al. (1994) or Aarts et al. (1997):

... I must say that, to me, the journey by bus seems faster and more comfortable ... In Munich, I change to a bus to Stuttgart, where I have work responsibilities ... I've travelled six times this year, counting the trip back and forth as one trip."

The second meaning field is characterised by train journeys in connection with travel comfort. Comfort plays an important role for passengers when travelling not only in terms of safety, but also for train passengers. From the statements of the respondents, the connection between the comfort of the train and the fast perception of time on the journey is clear. The time spent on the road thus passes by faster for passengers, if, for example, they can walk in the car, work comfortably, shorten their time with refreshments in the dining car. It is important for parents to entertain children in a compartment with enough space to paint, read and relax:

Speaking for myself, train transport is safer and more comfortable for me, both in terms of the fact that I can use the toilet at any time, or have a snack or enjoy the countryside, or possibly work on a laptop.

Since we have a child, we most often play, sing, talk – in short, we try to keep the little one entertained. If I ride alone, I read or relaxed. This is an advantage of the train. You have fun and the journey goes by faster.

The third meaning field connects statements about the rapid passage of time in an aircraft in connection with its higher cruising speed and the associated faster passage of time. The average speed of a direct flight from Lufthansa on the Prague–Munich route is almost 320 km/h. This speed is strikingly reminiscent of the territory of HSR speeds, which by their very nature should be the largest competitor at medium distances for air transport (Albalate et al., 2015; Dobruszkes, 2011).

The statements regarding the reference train show complaints about unsatisfactory railway connections on the Prague–Munich route with too complicated, slow, and often expensive rail transport. The common feature of this group is the passage of time in the form of the absolute priority of a rapid transfer from Prague to Munich and back, which in 2019 is provided only by Lufthansa by direct flight. For the time being, the current railway connection does not yet allow a one-day return journey.

Well, it takes a long time by train. So there is that Western Express, it takes 8 to 9 hours. I have a feeling, but it doesn't solve the transfer... That would be a matter

for the whole day. So, I have a meeting there tomorrow, so I'll fly there and be back tomorrow night, while the train cannot offer similar conditions. Yes, it's faster and even with the transfer in Munich, if it flew straight, it's the easiest... But unfortunately. That means, in terms of price, I think it would be more expensive – in addition, those international train journeys are certainly more expensive.

I would be motivated to reduce my travel time by train if it was a high-speed train. If we had a choice between 50 minutes by plane and 2 or 3 hours by train, we would choose a train. The hours spent at the airport in advance, check-in, etc. would be eliminated. In the same way, we would choose a train if there were no direct flights between the two destinations, or we would consider another country to fly to.

The main summary of the third meaning field for the passage of time is the definition of a key decisive factor in the passage of time – the speed that passengers potentially demand even for the high-speed transport system on the Prague–Munich route. With the current train connection with an average speed of 78 km/h, however, the railway is uncompetitive with direct air connections, despite the several hours of waiting at an airport that passengers can overlook.

As reasons for the faster passage of time in the fourth meaning field of the car, the informants state the motorway speed resulting from the presence of quality motorways between the cities of Prague and Munich, and the possibility of individual rest while driving, the possibility of refreshments along motorways, and the overall individuality in the process of choosing the route, for example in the case of traffic jams:

Sometimes I go for a smoke, so neither the train nor the bus allows me to do this, so for me the best option is a company car and a gas station stop.

On the contrary, some informants mention the potentially slower passage of time in the car during traffic congestion, which again supports the theoretical discussion (Cheng and Tsai, 2014; Meng et al., 2018; Wittmer and Laesser, 2010) about the slower passage of time in unpleasant situations. On the contrary, pleasant situations, such as riding with friends, can speed up the passage of time in the car.

If the traffic is smooth, then I perceive [passage of time] well. If there is a traffic jam on the road, as in the case of D1, then the road becomes a horror.

Congestion is difficult to avoid in certain sections, although there are various applications, such as Waze, which help drivers, and car navigation is connected to a radio station and looking for detour routes, but in my experience [the Prague–Munich route] it is such a well-conceived route that there are usually no traffic jams. Traffic jams may form in front of Munich at rush hour around 4 pm, but this is nothing dramatic. Passing by this route is usually fine.

I was a little worried about D1, but today you can download various applications, and I've seen that D1 is passable, although there are a lot of restrictions. And then from that Prague, as we went to Pilsen on to Munich, it went fine there.

It depends on whether I'm driving alone or with someone. If I'm driving alone, I learn English or some education. Sometimes even movies, but that would have to be a really long trip. Sometimes I read a book, it really depends. When we drove in a group, I drove. We talked about what we were up to and listened to the radio. The time passed by quickly."

Overall, the effects of habituation due to regular bus use, the effects of individualisation and freedom of movement in independent and flexible car travel, the effects of speed and ability to travel within 24 hours by plane, and the effects of comfort when travelling by train can be considered as crucial.

4.3 Perspectives for HSR

The defined concept of safety should also be considered for the perspective construction of HSRs and their successful use. The analysis of perceived safety in transport modes showed two completely different levels of safety perception: the level of perception of safety in terms of accidents that rail transport does not suffer much from, and the level of personal safety (Tab. 1). In the context of the future construction of high-speed train connections on the Prague–Munich route, the perceived safety of the examined competitive transport mode will play an important role for travel behaviours, or for deciding on the use of transport mode on the route.

In terms of the passage of time, the advantage of rail transport has been clearly demonstrated in the form of a road comfort factor, which guarantees passengers a feeling of fast travel (Tab. 1). The required comfort combined with a fast and smooth journey with the possibility to work on the train could serve in the future as a primary marketing tool and a convincing argument for moving from the plane to HSR on the Prague–Munich route.

Travel time must also be competitive so that passengers can use the rail for a day trip there. The planning strategy should be aimed at changing the mode choice attitude from aircraft to HSR, by emphasising the slow flow of time while waiting at the airport and emphasising the fast flow on HSR. Emphasis should be placed on the prestige associated with high ground cruising speeds and low accident frequency. At the same time, however, HSR travel should retain the hallmark of a safe transport mode with a high degree of control, which must not consciously slow down the feeling of travelling by train, as is the case with waiting at airport checks. HSR must maintain the image of safe travel on the question of safety without the threat of terrorism, just as air transport has done. As can be seen from Table 2, the disadvantages of the railway can be eliminated by frequent inspections by on-board staff or by increasing the culture of the station environment and, of course, by increasing the travel speed thanks to HSR.

Investments in HSR on the Prague–Munich route should be made with a sense for the above-mentioned defined factors, which are often neglected in HSR research strategies.

5. Conclusion

Safety and the passage of time in transport are complex topics of interest to many social scientists, which creates space for different perspectives. In our case, the analysis of perceived safety in vehicles made it possible to define two completely different levels of safety perception: (1) the level of accident frequency, in which the perceived general safety of individual modes of transport plays a role; and (2) the level of personal safety, in which, in addition to the identified reasons, the role of gender manifested itself. The results showed a higher sensitivity of women to the level of personal safety in public transport, and for men, on the contrary, "riskier" thinking about safety in terms of accident frequency.

Choice factor		Aircraft	Train	Bus	Car
Safety	Risk of accident	High, fear of flying	Neutral	High, infrastructure	Marginalised if he/she drives or has an experienced driver
	Personal safety	High, the presence of staff	Low fear of theft	Medium, fear of theft	High, except for car pooling
Passage of time	Slow time passage	Waiting at the airport, checks	Low travel speed	The necessity to sit in one place	Traffic congestion, boredom behind the wheel
	Fast time passage	Top travel speed	Comfort, constant passage of time, possibilities to work	Regular travel for work	Quality highway, independent feeling, using one's own means

Tab. 2: Summary table of the influence of selected factors on transport modes on the Prague–Munich route (Notes: Red disadvantages of the train against the aircraft, green advantages.)

Source: authors' data collection and representation

The analysis of the passage of the time lapse factor showed four different views on the passage of time, which are derived from the preferred mode of the passenger. Bus users highlight the fast passage of time on the bus since they take the trip with a certain regularity. Aircraft users emphasise the high speed of transport, which gives them a feeling of a fast passage of time. Regular drivers and car passengers explain their quick journey by being able to set off at any time, regardless of the timetable, and highlight high-quality motorways that give them the opportunity to drive fast. The reference train connection is perceived, as pertains to passage of time, in connection with the feeling of comfort and the possibility to have fun on the train with a wide range of activities, including work. In addition to the slow passage of time due to the check-in process at airports, the passage of time on the plane and on the train is perceived equally in the context of distance: the advantage of a faster passage of time on an aircraft only becomes apparent when travelling longer distances, where the time physically spent on the aircraft is longer than the time spent at the airport during the check-in process.

From this understanding of safety and the passage of time, positive perspectives can be drawn for HSR planning on the medium-to-long-term Prague-Munich route. The results of the survey showed where further investments should be made to make the railways more attractive. In addition to the current low speed, the level of personal safety appears to be the biggest weakness of the choice of railways, which does not yet correspond to similar controls in air transport. HSR planning should not only focus on traditional economic and travel time factors, but also on the physical and social environment of vehicles, platforms, and terminals in terms of personal safety perception, as well as quality service in the field of flight crew service.

The resulting concepts are formed and developed by the passengers themselves with their ever-changing dynamic transport behaviours. How strong the driving forces in travel behaviours and mode choice in the factors of safety and the passage of time will be, will be demonstrated by the actual commissioning of the high-speed line on the Prague–Munich route. Due to the long-term planning and implementation of HSR, however, this connection may operate in a completely different transport and social context than it is today.

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